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EXAMINER	
TEETS, JONATHAN J	
ART UNIT	**PAPER NUMBER**
2123	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/777,548	IYENGAR, VIJAY S.
	Examiner	Art Unit
	Jonathan J. Teets	2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 12 February 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 12 February 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 2/12/2004.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claims 1-27 are presented for examination.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-20, 22-24 and 26-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-2 and 4-19 are directed to "a system for detecting clusters in space and time". This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract ides, naturally occurring article/phenomenon) since it fails to produce a useful, concrete and tangible result.

Specifically, the claimed subject matter does not produce a <u>tangible</u> result because the claimed subject matter fails to produce a result that is limited to having real world value rather than a result that may be interpreted to be abstract in nature as, for example, a thought, a computation, or manipulated data. More specifically, the claimed subject matter provides for the <u>determination of occurrences and solutions</u>. This produced result remains in the abstract and, thus, fails to achieve the required status of having real world value.

Claims 20 and 22-23 are directed to "a method for detecting clusters". This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract ides, naturally occurring article/phenomenon) since it fails to produce a useful, concrete and tangible result.

Specifically, the claimed subject matter does not produce a tangible result because the claimed subject matter fails to produce a result that is limited to having real world value rather than a result that may be interpreted to be abstract in nature as, for example, a thought, a computation, or manipulated data. More specifically, the claimed subject matter provides for the determination of occurrences and solutions. This produced result remains in the abstract and, thus, fails to achieve the required status of having real world value.

Claims 24 and 26-27 are directed to "a program storage device provided by machine, tangibly embodying a program of instructions automatically executable by the machine to perform method steps for determining a cluster". This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract ides, naturally occurring article/phenomenon) since it fails to produce a useful, concrete and tangible result.

Specifically, the claimed subject matter does not produce a tangible result because the claimed subject matter fails to produce a result that is limited to having real world value rather than a result that may be interpreted to be abstract in nature as, for example, a thought, a computation, or manipulated data. More specifically, the claimed

subject matter provides for the determination of occurrences and solutions. This produced result remains in the abstract and, thus, fails to achieve the required status of having real world value.

In view of the language of **claims 1-19**, the claimed invention, as written, is merely drawn to nonstatutory descriptive material since claimed "system" appears to be an apparatus claim that consists only of software program elements (i.e. program per se). In this instance, the claimed "components" for detecting clusters, generation module, search module, convex container module, solution evaluation module and so forth, do not impart any functionality as being employed as a computer component. Further, the specification does not appear to set forth that claimed "system for detecting clusters" consists of anything other than simply software elements.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-2, 4-16, 18-20, 22-24 and 26-27** are rejected under 35 U.S.C. 102(b) as being anticipated by **Joseph Glaz and N. Balakrishnan (Scan Statistics and Applications), herein referred to as Glaz et al.**.

As to **claim 1**, Glaz et al. teach:

A system for detecting clusters in space and time using input data on occurrences of a phenomenon and characteristics at a plurality of locations and times comprising (The purpose is the same as with a spatial scan statistic, to detect clusters of events... – see e.g., Page 307, ¶ 6, lines 2-3):

an expectation generation module determining expected occurrences of a phenomena at a plurality of locations and a plurality of times (Conditioning on the observed total number of events, $X(A)$, the definition of the scan statistic is the maximum likelihood ratio over all possible zones $S_w = \frac{\max_{W \in w} L(W)}{L_0} = \max_{W \in w} \frac{L(W)}{L_0}$, where $L(W)$ is the likelihood function for zone W, expressing how likely the observed data are given a differential rate of events within and outside the zone, and where L_0 is the likelihood function under the null hypothesis. The likelihood function here acts as the claimed generation module that calculates the expected number of events, which are the functional equivalent to the expected occurrences. – see e.g., Page 305, ¶ 6, lines 1-6);

an occurrence modeling module determining actual occurrences of the phenomena at a plurality of locations and a plurality of times (In the latter case, random data sets are generated under the null hypothesis, and the scan statistic is calculated in each case, comparing the values from the *real* and random data sets to obtain a hypothesis test. – see e.g., Page 304, ¶ 2, lines 7-10);

a search module searching the expected occurrences and the actual occurrences for a plurality of candidate solutions (...*comparing* the values from the *real* and *random* data sets to obtain a *hypothesis test*. The hypothesis test is functionally equivalent to the claimed candidate solutions. – see e.g., Page 304, ¶ 2, lines 9-10), wherein each solution is represented as a set of points (Let X denote a spatial point process where $X(B)$ is the random number of events in the set $B \subset A$. Where A represents a particular geographical area and individuals are defined as events whose locations constitute the point process. – see e.g., Page 305, ¶ 2, lines 1-2) in the three-dimensional space, and wherein each point corresponds to a location at a time (In space-time applications, one option is simply to define time as a third dimension and use a spherical window on that three-dimensional space. – see e.g., Page 313, ¶ 2, lines 1-2);

a convex container module determining at least one solution corresponding to a selected convex container shape from the plurality of candidate solutions (In addition, Alm (1997, 1998) also looked at circles, triangles, and other *convex* shapes (for the scanning window). – see e.g., Page 307, ¶ 3, lines 3-4); and

a solution evaluation module determining a strength metric for each solution determined by the convex container module (A circular variable size window was used. – see e.g., Page 316, ¶ 2, lines 2-3), the search module selecting a solution having a desirable strength (With 642 cases when 583.2 were expected, this area had a rate 10 percent higher than the New Mexico average, and it is significant with $p = 0.030$. – see e.g., Page 316, ¶ 3, lines 4-6), wherein the solution having the desirable strength

indicates a dominant cluster in the input data (When scanning for areas with high rates, a cluster was found in and around Albuquerque, containing Bernadillo, Cibola-Valencia, Los Alamos, Sandoval, San Miguel, Santa Fe, Socorro, and Torrance counties (Figure 1.1), almost half the total state population. – see e.g., Page 316, ¶ 3, lines 1-4).

For **claim 2**, Glaz et al. teach:

The system of claim 1, wherein the search module selects a strongest solution as determined by the solution evaluation module (When scanning for areas with high rates, a cluster was found in and around Albuquerque, containing Bernadillo, Cibola-Valencia, Los Alamos, Sandoval, San Miguel, Santa Fe, Socorro, and Torrance counties (Figure 1.1), almost half the total state population. With 642 cases when 583.2 were expected, this area had a rate 10 percent higher than the New Mexico average, and it is significant with $p = 0.030$. The scanning discussed in the reference is the functional equivalent to the claimed search module with the cluster being detected by this process. – see e.g., Page 316, ¶ 3, lines 1-6).

For **claim 4**, Glaz et al. teach:

The system of claim 1, wherein the input data on occurrences of a phenomenon comprise counts and times of the occurrences of the phenomenon at the locations in a time period (Broken down by age and sex, brain cancer and population data are available from 1973 to 1992 at the aggregated level of 32 counties. One analysis was

done scanning for areas with high rates (clusters) and another scanning for areas with low rates. – see e.g., Page 316, ¶ 2, lines 1-7).

For **claim 5**, Glaz et al. teach:

The system of claim 1, wherein the input data on characteristics of the locations and times comprise of the populations subject to the occurrences of the phenomenon at the locations and times (The measure is by nature nonhomogeneous, reflecting the geographical distribution of the population at risk. In most situations, we want to adjust for covariates that are known risk factors such as age or sex. – see e.g., Page 315, ¶ 3, lines 2-4).

For **claim 6**, Glaz et al. teach:

The system of claim 1, wherein the expectation generation model generates expected counts of occurrences at the locations and times using a Poisson model (Two different probability models are considered, based on Bernoulli counts and the Poisson process, respectively. – see e.g., Page 305, ¶ 2, lines 2-3).

For **claim 7**, Glaz et al. teach:

The system of claim 1, wherein the occurrence modeling module determines the occurrences as equal to the occurrences in the input data (Conditioning on the observed total number of events, $X(A)$, the definition of the scan statistic is the

maximum likelihood ratio over all possible zones $S_w = \frac{\max_{W \in w} L(W)}{L_0} = \max_{W \in w} \frac{L(W)}{L_0}$, where $L(W)$ is the likelihood function for zone W, expressing how likely the observed data are given a differential rate of events within and outside the zone, and where L_0 is the likelihood function under the null hypothesis. The likelihood function here calculates the expected number of events, which is conditioning on the *observed* total number of events. – see e.g., Page 305, ¶ 6, lines 1-6).

For **claim 8**, Glaz et al. teach:

The system of claim 1, wherein the occurrence modeling module determines the occurrences at the locations and times based on their characteristics and a domain dependent model (Which scan statistic to use will depend on the application at hand, which is discussed in terms of past as well as possible future practical applications in areas such as epidemiology, medical imaging, astronomy, archaeology, urban and regional planning, and reconnaissance. – see e.g., Page 303, ¶ 2, lines 7-11).

For **claim 9**, Glaz et al. teach:

The system of claim 8, wherein the occurrences are determined from the population using a Poisson model (If on the other hand, we are looking at fatal cardiac arrest in a population, we choose the Poisson model since such individuals are no longer part of the population numbers after the event occurs. – see e.g., Page 315, ¶ 3, lines 3-5).

For **claim 10**, Glaz et al. teach:

The system of claim 1, wherein the search module considers candidate solutions represented as sets of points and utilizes the convex container module to determine solutions having the desired shape from the candidate solutions (It is more natural to scan for clusters using the intersection of a spatial circle and a temporal interval, leading to a *cylindrical window*. The cylindrical window is mathematically convex and functionally equivalent to the claimed container module. – see e.g., Page 313, ¶ 2, lines 7-13).

For **claim 11**, Glaz et al. teach:

The system of claim 10, wherein the candidate solutions are initialized based on the input data (Using a Poisson model, the analysis is adjusted for age and sex. One analysis was done scanning for areas with high rates (clusters) and another scanning for areas with low rates. Adjusting the analysis for age and sex illustrates that the candidate solutions are initialized based on the input data, where the candidate solutions are found through the analysis and the input data is the age and sex data. – see e.g., Page 316, ¶ 2, lines 5-7).

For **claim 12**, Glaz et al. teach:

The system of claim 11, wherein each initial candidate solution is singleton point (Let X denote a spatial point process where $X(B)$ is the random number of events in

the set $B \subset A$. Two different probability models are considered, based on Bernoulli counts and the Poisson process, respectively. For the Bernoulli model, we consider only discrete measures μ such that $\mu(B)$ is an integer for all subsets $B \subset A$. Each unit of measure corresponds to an "entity" or "individual" who could be in either one of two states, for example with or without some disease, or being of a certain species or not. Individuals in one of these states are defined as events, and the location of those individuals constitute the point process. Under the null hypothesis, the number of events in any given area is binomially distributed, so that $X(B) \sim Bin(\mu(B), p)$ for some value p and for all sets $B \subset A$. $X(B)$ satisfies the definition of a singleton as it can be viewed as a set with exactly one element, even if the element is a set itself. This is because $X(B)$ is calculated as a random variable having a probability distribution. – see e.g., Page 316, ¶ 3, lines 1-6).

For **claim 13**, Glaz et al. teach:

The system of claim 10, wherein the search module determines candidate solutions from solutions considered using an iterative process (The complexity of Steps 1 and 2 is $O(GM \log M)$, as this does not have to be repeated for each Monte Carlo replication. The complexity of Steps 3 to 6 is $O(RGM)$. This algorithm (14.3.6) has 6 outlined steps and is therefore iterative. – see e.g., Page 313, ¶ 2, lines 1-3).

For **claim 14**, Glaz et al. teach:

The system of claim 13, wherein candidate solutions are created from solutions considered based on the chosen convex container shape (It is more natural to scan for clusters using the intersection of a spatial circle and a temporal interval, leading to a cylindrical window. Algorithm 14.3.6 can be adjusted for this purpose, if for each geographical circle, we also scan the time-dimension using a variable size temporal interval. It also means that the geographical and temporal size can vary independently of each other. The complexity of Steps 3 to 6 then becomes $O(RGMN^2)$ if exact times are known, and $O(RGMI^2)$ if times are aggregated into I time intervals. – see e.g., Page 313, ¶ 4, lines 7-13).

For **claim 15**, Glaz et al. teach:

The system of claim 1, wherein the convex container module determines a solution with minimum volume, given the selected convex container shape, that includes all the points in a given candidate solution (In terms of the scanning window, all used a variable size circle centered on the grid points, except for Kulldorff et al. (1998), who used a three-dimensional cylinder where the size of both the base and the height is variable independently of each other. The choice of scan statistic will depend on the particular application at hand, a topic we will turn to in Section 14.4. If the solution requires a minimum volume, then the cylinder size can be minimized accordingly. – see e.g., Page 307, ¶ 4, lines 8-11 and ¶ 5).

For **claim 16**, Glaz et al. teach:

The system of claim 1, wherein the convex container module determines a solution with maximum volume, given the selected convex container shape, that excludes all the points not in the given candidate solution (In terms of the scanning window, all used a variable size circle centered on the grid points, except for Kulldorff et al. (1998), who used a three-dimensional cylinder where the size of both the base and the height is variable independently of each other. The choice of scan statistic will depend on the particular application at hand, a topic we will turn to in Section 14.4. If the solution requires a maximum volume, then the cylinder size can be maximized accordingly. – see e.g., Page 307, ¶ 4, lines 8-11 and ¶ 5).

For **claim 18**, Glaz et al. teach:

The system of claim 1, wherein the solution evaluation module determines the strength metric based on all the points included in the solution and the expected occurrences determined by the expectation generation module and the occurrences determined by the occurrence modeling module (When scanning for areas with high rates, a cluster was found in and around Albuquerque, containing Bernadillo, Cibola-Valencia, Los Alamos, Sandoval, San Miguel, Santa Fe, Socorro, and Torrance counties (Figure 1.1), almost half the total state population. With 642 cases when 583.2 were expected, this area had a rate 10 percent higher than the New Mexico average, and it is significant with $p = 0.030$. The strength metric is represented as a p value, which is the probability of obtaining a result at least as extreme as that obtained,

assuming the truth of the null hypothesis that the finding was the result of chance alone. – see e.g., Page 316, ¶ 3, lines 1-6).

For **claim 19**, Glaz et al. teach:

The system of claim 1, wherein the strength metric is based on the likelihood ratio using the spatial scan statistic (Conditioning on the observed total number of events, $X(A)$, the definition of the scan statistic is the maximum likelihood ratio over all possible zones $S_w = \frac{\max_{W \in w} L(W)}{L_0} = \max_{W \in w} \frac{L(W)}{L_0}$, where $L(W)$ is the likelihood function for zone W, expressing how likely the observed data are given a differential rate of events within and outside the zone, and where L_0 is the likelihood function under the null hypothesis. – see e.g., Page 305, ¶ 6, lines 1-6).

As to **claims 20 and 24**, Glaz et al. teach:

A method for detecting clusters comprising:

receiving input data on occurrences of a phenomenon at locations and times and data on characteristics of the locations and times (Broken down by age and sex, brain cancer and population data are available born 1973 to 1992 at the aggregated level of 32 counties. – see e.g., Page 316, ¶ 2, lines 1-2);

determining actual occurrences of the phenomenon at the three-dimensional space-time points according to the input data (In 1989, a local resident detected an

excess of brain cancer in Los Alamos during the previous year. – see e.g., Page 316, ¶ 1, lines 2-3);

determining expected occurrences in the absence of any clustering of the phenomenon at the points according to the characteristics of the occurrences using a domain dependent model for the phenomenon (This cluster alarm was evaluated statistically by Kulldorff et al. (1998) using a space-time scan statistic, without finding a significant space-time cluster in Los Alarnos. Here, we will use a purely spatial scan statistic in more of a surveillance setting. – see e.g., Page 316, ¶ 1, lines 3-6);

selecting a convex container shape for determining a cluster in the input data (The space-time scan statistic, using a variable size cylindrical window, has been applied to brain cancer incidence in New Mexico by Kulldorff et al. (1998). – see e.g., Page 316, lines 8-9); and

determining a solution represented as a set of points that conforms to the selected convex container shape for a cluster with a desirable strength (When scanning for areas with high rates, a cluster was found in and around Albuquerque, containing Bernadillo, Cibola-Valencia, Los Alamos, Sandoval, San Miguel, Santa Fe, Socorro, and Torrance counties (Figure 1.1), almost half the total state population. With 642 cases when 583.2 were expected, this area had a rate 10 percent higher than the New Mexico average, and it is significant with p = 0.030. As the New Mexico mortality rate was 16 percent lower than the United States average during 1986-90 [Miller el al. (1993)], this cluster may indicate that the Albuquerque area is more similar to the rest of the United

States in terms of brain cancer than other parts of New Mexico. – see e.g., Page 316, ¶ 3, lines 1-9).

For **claims 22 and 26**, Glaz et al. teach:

The method of claims 20 and 24, wherein determining expected occurrences further comprises generating expected counts of occurrences at the locations and times using a model (Using a Poisson model, the analysis is adjusted for age and sex. – see e.g., Page 316, ¶ 2, lines 5-6).

For **claims 23 and 27**, Glaz et al. teach:

The method of claims 20 and 24, further comprising determining a strength of the cluster based on points included in the cluster, and the expected occurrences and the actual occurrences (When interested in areas with either high or low rates, then we can either do two one-sided tests as we have done above, or we can do a single two-sided test, which is recommended. The clusters found will be the same, but not the p value. For the two-sided test, $p = 0.067$. – see e.g., Page 316, ¶ 5, lines 1-4).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. **Claims 3, 21 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Joseph Glaz and N. Balakrishnan (Scan Statistics and Applications)**, herein referred to as Glaz et al. as applied to claims 1, 20 and 24 above.

Glaz et al. teach the limitations of claims 1, 20 and 24 for the reasons above.

Glaz et al. differs from the claimed invention in that a cache module *per se* to save the solutions having the desired shape determined by the convex container module for previously examined sets of points is not explicitly named.

Glaz et al. does teach the SatScan software suite which uses Algorithm 14.3.6 (see e.g., Page 314, ¶ 4, lines 1-10). Algorithm 14.3.6 teaches the use of an *array to memorize* the sorted population points during the first step and can be adjusted to utilize a *cylindrical window* when scanning for clusters. When implemented in such a software environment, the array would be the functional equivalent to the claimed cache with the cylindrical window being the functional equivalent to the convex container module (see e.g., Page 313, Algorithm 14.3.6 and ¶ 3, lines 7-10).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the SatScan suite when scanning for clusters because Glaz et al. teach that the software is available free of charge from the authors, or from the World Wide Web (see e.g., Page 314, ¶ 3, lines 1-3).

Allowable Subject Matter

7. **Claim 17** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and rewritten to overcome the rejection(s) under 35 U.S.C. 101, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

8. While Glaz et al. teach a method for detecting time-space clusters, Toyoma (referenced below) teaches a system and method for automatically detecting clusters of data points within a data space, Kulldorff (referenced below) teaches a method of detection and inference for spatial clusters of a disease as well as a space-time scan statistic, useful for evaluating space-time cluster alarms, and illustrates the method on a recent brain cancer cluster alarms in Los Alamos, NM, none of these references taken either alone or in combination with the prior art of record disclose a method for detecting time-space clusters, specifically including:

(claim 17) "...convex container module determining a solution that maximizes a measure representing the equality between the set of points in the given candidate

solution and the set of points included in the solution, given the selected convex container shape.",

in combination with the remaining elements and features of the claimed invention. It is for these reasons that the applicant's invention defines over the prior art of record.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Toyama (Patent No.: US 6,229,918), which teaches a system and method for automatically detecting clusters of data points within a data space.

Martin Kulldorff and Neville Nagarwalla (Spatial Disease Clusters: Detection and Inference), which teaches a method of detection and inference for spatial clusters of a disease.

M Kulldorff, W F Athas, E J Feurer, B A Miller, and C R Key (Evaluating Cluster Alarms: A Space-Time Scan Statistic and Brain Cancer in Los Alamos, New Mexico), which teaches a space-time scan statistic, useful for evaluating space-time cluster alarms, and illustrates the method on a recent brain cancer cluster alarms in Los Alamos, NM.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan J. Teets whose telephone number is (571)

270-1321. The examiner can normally be reached on Mon through Fri, 8:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jonathan J Teets
Examiner
Art Unit 2123

J.T. 2/1/2007

Kamini Shah

KAMINI SHAH
SUPERVISORY PATENT EXAMINER